

521.452

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

Rec'd PCT/EP 18 JAN 2005

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
19 February 2004 (19.02.2004)

PCT

(10) International Publication Number
WO 2004/014827 A1

- (51) International Patent Classification⁷: **C07C 37/60**
- (21) International Application Number:
PCT/EP2003/007056
- (22) International Filing Date: 2 July 2003 (02.07.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
MI2002A001662 26 July 2002 (26.07.2002) IT
- (71) Applicant (for all designated States except US): **BORREGAARD ITALIA S.P.A.** [IT/IT]; Via Carducci, 15, I-20123 Milan (IT).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **ANDREOTTI, Grazia** [IT/IT]; Via Ambrosini 1, I-20052 Monza-Milano (IT). **PANSERI, Pietro** [IT/IT]; Via G. Da Campione, 20, I-24100 Bergamo (IT). **MESSORI, Vittorio** [IT/IT]; Via Archimede, 105, I-20129 Milan (IT). **MARIANI, Oliviero** [IT/IT]; Via A. Volta 6, I-24040 Madone-Bergamo (IT). **BOGNINI, Giezi** [IT/IT]; Via Carducci 4, I-24036 Ponte S. Pietro-Bergamo (IT).
- (74) Agents: **DE GREGORI, Antonella et al.**; Ing. Barzano & Zanardo Milano SPA, Via Borgonuovo, 10, I-20121 Milan (IT).
- (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: HYDROXYLATION PROCESS FOR AROMATIC COMPOUNDS CONTAINING A DIOXA- HETEROCYCLIC SYSTEM

(57) Abstract: Process for the hydroxylation of aromatic compounds containing a dioxo-heterocyclic system which comprises directly hydroxylating said compounds with hydrogen peroxide in; the presence of a zeolitic catalyst having the general formula: $x\text{TiO}_2 \cdot (1-x)\text{SiO}_2$ wherein x is a number ranging from 0.0001 to 0.04.

WO 2004/014827 A1

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 03/07056

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C07C37/60

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C07C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, CHEM ABS Data, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>US 5 840 997 A (MUNSON BRANT P ET AL) 24 November 1998 (1998-11-24) cited in the application Reaction Scheme in column 3 abstract; examples 1,2</p> <p style="text-align: center;">--- -/--</p>	1-10



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

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Date of the actual completion of the international search

29 October 2003

Date of mailing of the international search report

10/11/2003

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Guspanova, J

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 03/07056

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	A.K.SINHABABU AND R.T.BORCHARDT: "Aromatic Hydroxylation. Hydroxybenzaldehydes from Bromobenzaldehydes via Reaction of In Situ Generated, Lithiated alfa-Morpholinobenzyl Alkoxides with Nitrobenzene" JOURNAL OF ORGANIC CHEMISTRY, vol. 48, no. 12, 1983, pages 1941-1944, XP002258954 page 1943, column 1 page 1943, column 2, paragraph 4 -page 1944, column 1, paragraph 1 page 1944, column 1, paragraph 6 -page 1944, column 2, paragraph 1 -----	1-10
A	EP 1 110 910 A (CHINA PETROCHEMICAL CORP ;RES INST OF PETROLEUM PROC SIN (CN)) 27 June 2001 (2001-06-27) page 2, paragraph 2; examples 12,13; tables 1,2 -----	1-10
A	US 4 701 428 A (BELLUSSI GIUSEPPE ET AL) 20 October 1987 (1987-10-20) cited in the application abstract; example 3 column 2, line 47-61 -----	1-10

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 03/07056

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5840997	A	24-11-1998	GB 2323843 A , B	07-10-1998
EP 1110910	A	27-06-2001	CN 1301599 A	04-07-2001
			EP 1110910 A1	27-06-2001
			JP 2001206714 A	31-07-2001
			US 2001021369 A1	13-09-2001
US 4701428	A	20-10-1987	IT 1187661 B	23-12-1987
			AT 52945 T	15-06-1990
			DE 3671389 D1	28-06-1990
			DK 184986 A , B,	24-10-1986
			EP 0200260 A2	10-12-1986
			NO 861578 A , B,	24-10-1986
			US 4859785 A	22-08-1989
			US 4954653 A	04-09-1990